

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: ERIC J. BERGMAN
APPLICATION NO.: NOT YET ASSIGNED
FILED: OCTOBER 7, 2003
FOR: **METHODS FOR CLEANING SEMICONDUCTOR
SURFACES**

EXAMINER:
ART UNIT:
CONF. NO:

INFORMATION DISCLOSURE STATEMENT

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. Timing of Submission

This information disclosure statement is being filed concurrently with the filing of the application. The references listed on the enclosed Form PTO-1449 (modified) may be material to the examination of this application; the Examiner is requested to make them of record in the application.

2. Cited Information

Copies of the foreign references and literature can be found in parent U.S. Application Serial No. 09/811,925.

3. Effect of Information Disclosure Statement (37 C.F.R. § 1.97(h))

This Information Disclosure Statement is not to be construed as a representation that: (i) a search has been made; (ii) additional information material to the examination of this application does not exist; (iii) the information, protocols,

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- . results and the like reported by third parties are accurate or enabling; or (iv) the cited information is, or is considered to be, material to patentability. In addition, applicant does not admit that any enclosed item of information constitutes prior art to the subject invention and specifically reserves the right to demonstrate that any such reference is not prior art.

4. Fee Payment

No fees are believed due because this Information Disclosure Statement is being filed concurrently with the filing of the application.

Respectfully submitted,

Perkins Coie LLP

Date: Oct. 6, 2003

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EM No. EV 254990096US				COMPLETE IF KNOWN	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Form PTO-1449 (Modified) (Use several sheets if necessary)				Application Number	Not yet assigned
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				First Named Inventor	Eric J. BERGMAN
				Group Art Unit	
				Examiner Name	
Sheet	1	of	5	Attorney Docket No.	54008.8012.US04

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No.	U.S. Patent or Application		Name of Patentee or Inventor of Cited Document	Date of Publication or Filing Date of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		NUMBER	Kind Code (if known)			
	AA	5,055,138		Slinn	10/08/91	
	AB	5,120,370		Mori et al.	06/09/92	
	AC	5,647,386		Kaiser	07/15/97	
	AD	5,503,708		Koizumi et al.	04/02/96	
	AE	5,308,745		Schwartzkopf	05/03/94	
	AF	4,695,327		Grebinski	09/22/87	
	AG	5,632,847		Ohno et al.	05/27/97	
	AH	5,911,837		Matthews	06/15/99	
	AI	5,705,089		Sugihara et al.	01/06/98	
	AJ	5,244,000		Stanford et al.	09/14/93	
	AK	5,896,875		Yoneda	04/27/99	
	AL	4,974,530		Lyon	12/04/90	
	AM	5,120,370		Mori et al.	06/09/92	
	AN	5,647,386		Kaiser	07/15/97	
	AO	5,248,380		Tanaka	09/28/93	
	AP	5,520,744		Fujikawa et al.	05/28/96	
	AQ	5,415,191		Mashimo et al.	05/16/95	
	AR	5,658,615		Hasebe et al.	08/19/97	
	AS	5,858,107		Chao et al.	01/12/99	
	AT	5,971,368		Nelson et al.	10/26/99	
	AU	5,234,540		Grant et al.	08/10/93	
	AV	5,803,982		Kosofsky et al.	09/08/98	
	AW	5,944,907		Ohmi	08/31/99	
	AX	5,232,511		Bergman	08/03/93	
	AY	5,776,296		Matthews	07/07/98	
	AZ	6,249,933		Berfield	06/26/01	
	BA	6,267,125		Bergman et al.	07/31/01	
	BB	6,273,108		Bergman et al.	08/14/01	
	BC	6,146,469		Toshima	11/14/00	
	BD	4,917,123		McConnell et al.	04/17/90	
	BE	4,749,440		Blackwood et al.	06/07/88	
	BF	4,817,652		Liu	04/04/89	
	BG	5,571,367		Nakajima et al.	11/05/96	
	BH	5,063,609		Lorimer	11/05/91	
	BI	5,246,526		Yamaguchi et al.	09/21/93	
	BJ	5,372,651		Kodama	12/13/94	
	BK	3,898,141		Ermanis et al.	08/05/75	
	BL	4,050,954		Basi	09/27/77	

EXAMINER	DATE CONSIDERED
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		NUMBER	Kind Code (if known)			
	BM	4,261,791		Shwartzman	04/14/81	
	BN	4,264,374		Beyer et al.	04/28/81	
	BO	4,615,762		Jastrzebski	10/07/86	
	BP	4,899,767		McConnell	02/13/90	
	BQ	4,943,540		Ren et al.	07/24/90	
	BR	4,971,654		Schnegg et al.	11/20/90	
	BS	5,181,985		Lampert et al.	01/26/93	
	BT	5,221,423		Sugino et al.	06/22/93	
	BU	5,294,570		Fleming Jr. et al.	03/15/94	
	BV	5,464,480		Matthews	11/07/95	
	BW	5,489,557		Jolley	02/06/96	
	BX	5,158,100		Tanaka et al.	10/27/92	
	BY	5,235,995		Bergman et al.	08/17/93	
	BZ	5,238,500		Bergman	08/24/93	
	CA	5,129,955		Tanaka	07/14/92	
	CB	5,950,643		Miyazaki et al.	09/14/99	
	CC	5,105,556		Kurokawa et al.	04/21/92	
	CD	5,326,406		Kaneko et al.	07/05/94	
	CE	4,186,032		Ham	01/29/80	
	CF	5,832,177		Shinagawa et al.	11/03/98	
	CG	5,964,952		Kunze-Concewitz	10/12/99	
	CH	5,378,317		Kashiwase et al.	01/03/95	

FOREIGN PATENT DOCUMENTS								
Examiner Initials*	Cite No.	Foreign Patent or Application			Name of Patentee or Applicant of Cited Document	Date of Publication or Filing Date of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Offic e	NUMBER	Kind Code (if known)				
	CI	JP	4-302144		Hitachi, Ltd.	10/26/1992		
	CJ	EP	0 782 177 A2		Texas Instruments Incorporated	07/02/1997		
	CK	JP	H03-208900		Susumu Otsuka et al.	09/12/1991		
	CL	JP	H04-298038		Hitachi Cable, Ltd.	10/21/1992		
	CM	JP	S61-004232		Yukinobu Tanno et al.	01/10/1986		
	CN	JP	62-117330		Toshio Wada et al.	05/28/1987		
	CO	JP	8-8222		Sony Corporation	01/12/1996		
	CP	JP	52-12063		Hiroshi Ikeda	04/04/1977		
	CQ	JP	H04-125927		Yutaka Watarai et al.	04/27/1992		

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	CR	JP	05-013398		Hitachi Zosen Corp.	01/22/1993		
	CS	JP	H01-262627		Mikio Tsuji	10/19/1989		
	CT	JP	04-370931		Hitachi Zosen Corp.	12/24/1992		
	CU	JP	05-283389		NEC Corp.	10/29/1993		
	CV	JP	03-072626		Dainippon Screen Mfg. Co., Ltd.	03/27/1991		
	CW	JP	06-204130		Mitsubishi Electric Corp.	07/22/1994		
	CX	JP	04-302145		Hitachi Ltd.	10/26/1992		
	CY	JP	07-159980		Nikon Corp.	06/23/1995		
	CZ	JP	05-259139		Hitachi Ltd.	10/08/1993		
	DA	JP	05-109686		Nippon Steel Corp.	04/30/1993		
	DB	JP	63-110732		NEC Corp.	05/16/1988		
	DC	JP	05-902329			04/09/1993		
	DD	JP	02-164035		NEC Corp.	06/25/1990		
	DE	JP	08-160032		Toshiba Corp.	06/21/1996		
	DF	JP	08-08222		Sony Corp.	01/12/1996		
	DG	JP	05-047741		Dainippon Screen Mfg. Co.	02/26/1993		
	DH	JP	04-326516		NEC Corp.	11/16/1992		
	DI	JP	62 118528		Matsushita Electronics Corp.	05/29/1987		
	DJ	JP	05-183151		Matsushita Elec. Ind. Co. Ltd.	07/23/1993		
	DK	EU	0 472 441		Seiko Epson Corp.	08/1991		
	DL	EU	0 548 596		Matsuoka Terumi	11/30/1992		
	DM	EU	0 587 889		Ohmi Tadahiro	05/13/1992		
	DN	JP	04 301245		Canon Inc.	10/23/1992		

OTHER PRIOR ART-NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume issue number(s), publisher, city and/or country where published.		
	DO	Abstract of JP 3041729 published 2/22/91.		
	DP	Heyns, M.M., et al. "New Wet Cleaning Strategies for Obtaining Highly Reliable Thin Oxides," MRP Symposium Proceedings on Materials Research Society, Spring Meeting, San Francisco, CA April 12-13, 1993, p. 35 (1993)		
	DQ	Adler, Marilyn Grace and Hall, George Richard, "The Kinetics and Mechanism of Hydroxide Ion Catalyzed Ozone Decomposition in Aqueous Solution" <i>J.Am.Chem.Soc.</i> , Volume 72, pp. 1884-86, 1950.		
	DR	Nelson, Steve, "Ozonated water for photoresist removal" <i>Solid State Technology</i> , pp. 107-112 (July 1999)		

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	DS	Christenson, Kurt K., et al. "Deionized Water Helps Remove Wafer Stripping 'Resist'-ance," <i>www.precisioncleaningweb.com - Precision Cleaning Web - Archives</i> , pp. 10-20 (April 1998)		
	DT	Sehested, K., et al., "Decomposition of Ozone in Aqueous Acid Solutions (pH 0-4)," <i>J. Phys. Chem.</i> , pp. 1005-1009 (1992)		
	DU	Krusell, W.C. et al., "Cleaning Technology for High Volume Production of Silicon Wafers," <i>ECS Proc. of the First Int'l. Symposium on Cleaning Technology I Semiconductor Device Mfg.</i> , pp. 23-32 (October 1989)		
	DV	Vig, John R., "UV/Ozone Cleaning of Surfaces," <i>U.S. Army Elec. Tech. and Devices Lab.</i> , pp. 1-26		
	DW	Vig, John R., "UV/Ozone Cleaning of Surfaces: A Review," <i>Surface Contamination: Genesis, Detection, and Control</i> , pp. 235-253(1979)		
	DX	Tong, Jeremy, et al., "Aqueous Ozone Cleaning of Silicon Wafers," <i>ECS Extended Abstracts, Phoenix, AZ</i> , Abstract No. 506, pp. 753 (October 13-17, 1991)		
	DY	Zafonte, Leo, et al., "UV/Ozone Cleaning For Organics Removal on Silicon Wafers," <i>SPIE Optical Microlithography III: Technology for the Next Decade</i> , Vol. 470, pp. 164-175 (1984)		
	DZ	Baumgärtner, H., et al., "Ozone Cleaning of the Si-SiO ₂ System," <i>Appl. Phys. A</i> , Vol. 43, pp. 223-226 (1987)		
	EA	Isagawa, Tatsuhiko, et al., "Ultra Clean Surface Preparation Using Ozonized Ultrapure Water," <i>Extended Abstracts of the 1982 Int'l. Conf. on Solid State Devices and Materials</i> , pp. 193-195 (1992)		
	EB	Shimada, H., et al., "Residual-Surfactant-Free Photoresist Development Process," <i>J. Electrochem. Soc.</i> , 139(6):1721-1730 (June 1992)		
	EC	Tong, Jeremy K. et al., "Aqueous Ozone Cleaning of Silicon Wafers," <i>Proc. of 2nd Int'l. Symposium on Cleaning Tech. In Semiconductor Device Mfg.</i> , pp. 18-25 (October 1992)		
	ED	Tong, Jeremy K., et al., "Aqueous Ozone Cleaning of Silicon Wafers," <i>Res. Soc. Symp.</i> , pp. 18-25 (1993)		
	EE	Ohmi, T., et al., "Native Oxide Growth and Organic Impurity Removal on Si Surface with Ozone-Injected Ultrapure Water," <i>J. Electrochem. Soc.</i> , 140(3):804-810 (March 1993)		
	EF	Vig, John R., et al., "UV/Ozone Cleaning of Surfaces," <i>IEEE Transactions on Parts, Hybrids, and Packaging</i> , Vol. PHP-12(4):365-370 (December 1976)		
	EG	Vig, John R., "UV/ozone cleaning of surfaces," <i>U.S. Army Electronics Technology and Devices Laboratory, ERADCOM, Ft. Monmouth, NJ, 07703-5302</i> , pp. 1027-1034 (September/October 1984)		
	EH	Tabe, Michiharu, "UV ozone cleaning of silicon substrates in silicon molecular beam epitaxy," <i>Appl. Phys. Lett.</i> , 45(10):1073-1075 (November 1984)		
	EI	Zazzera, L.A., et al., "XPS and SIMS Study of Anhydrous HF and UV/Ozone-Modified Silicon (100) Surfaces," <i>J. Electrochem. Soc.</i> , 136(2):484-491 (February 1989)		
	EJ	Gabriel, Calvin, et al., "Reduced Device Damage Using An Ozone Based Photoresist Removal Process," <i>SPIE Advances in Resist Technology and Processing VI</i> , Vol. 1086, pp. 598-604 (1989)		

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	EK	Suemitsu, Maki, et al., "Low Temperature Silicon Surface Cleaning by HF Etching/Ultraviolet Ozone Cleaning (HF/UVOC) Method (I) -Optimization of the HF Treatment-," <i>Japanese Journal of Applied Physics</i> , 28(12):2421-2424 (December 1989)		
	EL	Kern, Werner, "The Evolution of Silicon Wafer Cleaning Technology," <i>J. Electrochem. Soc.</i> , 137(6):1887-1892 (June 1990)		
	EM	Kasi, S.R., et al., "Surface Hydrocarbon Removal from Si by UV/Ozone," <i>ECS Extended Abstracts</i> , No. 458, pp. 691-692 (199)		
	EN	Kasi, Srinandan R., et al., "Vapor phase hydrocarbon removal for Si processing," <i>Appl. Phys. Lett.</i> , 57(20):2095-2097 (November 1990)		
	EO	Huynh, Cuc K., et al., "Plasma versus ozone photoresist ashing: Temperature effects on process-induced mobile contamination," <i>J. Vac. Sci. Technol.</i> , B9(2):353-356 (Mar/Apr 1991)		
	EP	Bedge, Satish, et al., "Kinetics of UV/O ₂ Cleaning and Surface Passivation Experiments and Modeling," <i>Mat. Res. Soc. Symp. Proc.</i> , Vol. 259, pp. 207-212 (1992)		
	EQ	Goulding, M.R., "The selective epitaxial growth of silicon," <i>Materials Science and Engineering</i> , Vol. B17, pp. 47-67 (1993)		
	ER	Ganesan, Gans S., et al., "Characterizing Organic Contamination in IC Package Assembly," <i>The Int'l. Soc. for Hybrid Microelectronics</i> , Vol. 17, #2, Second Quarter, pp. 152-160 (1994)		
	ES	Egitto, F.D., et al., "Removal of Poly(Dimethylsiloxane) Contamination From Silicon Surfaces With UV/Ozone Treatment," <i>Mat. Res. Soc. Symp. Proc.</i> , Vol. 385, pp. 245-250 (1995)		
	ET	Amick, J.A., "Cleanliness and the Cleaning of Silicon Wafers," <i>Solid State Technology</i> , pp. 47-52 (November 1976)		
	EU	Bolon, D.A., et al., "Ultraviolet Depolymerization of Photoresist Polymers," <i>Polymer Engineering and Science</i> , 12(2):108-111 (March 1972)		
	EV	Krusell, W.C., et al., "The Characterization of Silicon Substrate Cleaning Treatments by use of SIMS and MOS Electrical Testing," <i>ECS Extended Abstracts</i> , No. 229, p. 331-332 (1986)		
	EW	Anantharaman, Ven, Ph.D., et al., "ORGANICS: Detection and Characterization of Organics in Semiconductor DI Water Processes," <i>Ultracure Water</i> , pp. 30-36 (April 1994)		
	EX	"Ozone Concentration Measurement In A Process Gas," <i>Proposed IOA Pan American Group Guideline</i> , pp. 1-21 (December 1993)		
	EY	"Ozone for Semiconductor Applications," Sorbios, pp. 1-6 (October 1991)		

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